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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/730,781	12/07/2000	Jonathan Herman Fischer	FISCHER 35-47-14	9128

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Farkas & Manelli, PLLC
7th Floor
2000 M Street, N.W.
Washington, DC 20036-3307

EXAMINER

BRINEY III, WALTER F

ART UNIT	PAPER NUMBER
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2644

4

DATE MAILED: 11/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

TS

Office Action Summary

Application No.

09/730,781

Applicant(s)

FISCHER ET AL.

Examiner

Walter F Briney III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3-5, 10, 12-14, 20-23, 25, 32, and 33 are rejected under 35 U.S.C. 102(e) as being anticipated by Yeap et al. (US Patent 6,052,420).

Claim 1 is limited to a **DSL front end, comprising: an AM interference canceller that outputs a signal representative of AM interference**; Yeap discloses a noise estimator (i.e. AM interference canceller) that outputs a cancellation signal (i.e. signal representative of AM interference) (figure 5 and column 6, lines 16-24). **A hybrid that provides a bi-directional interface with a communication channel**; Yeap discloses a hybrid (figure 5, element 13 and column 5, lines 53-56). **Said hybrid generating an output signal representative of a signal received from said communication channel**; Yeap discloses the hybrid generating an output representing its input (i.e. communication channel) (column 5, line 53-column 6, line 6). **A summer that combines said output of said AM interference canceller with a signal based upon the output of the hybrid such that the AM interference in said DSL front end is substantially cancelled**; Yeap discloses subtracting with an adder the differential

signal (i.e. output of hybrid) and common mode noise (i.e. output of AM interference canceller) (column 5, lines 53-column 6, line 6). Therefore, Yeap discloses all limitations of the claim.

Claim 3 is limited to **the DSL front end according to claim 1**, as covered by Yeap, **wherein: said digital subscriber line is an asymmetric DSL (ADSL)**; Yeap discloses providing interference cancellation for a ADSL (column 2, lines 31-62). Therefore, Yeap discloses all limitations of the claim.

Claim 4 is limited to **the DSL front end according to claim 1**, as covered by Yeap, **further comprising: an adaptive circuit to determine an amount of differential mode coupling of said interfering AM radio signal with respect to an amount of common mode coupling of said interfering AM radio signal**; Yeap discloses performing cross correlation (i.e. determining an amount of similarity of one signal with respect to another) between a common mode signal (i.e. interfering AM radio signal) (figure 2, element 17) and the noise corrected differential signal (i.e. signal representative of differential mode coupling) (figure 2, element 20) to determine how much differential interference exists on the received signal (figure 2, element S_{DM} and column 3, lines 37-43). Therefore, Yeap discloses all limitations of the claim.

Claim 5 is limited to **the digital subscriber line front end according to claim 1**, as covered by Yeap, **further comprising: a reference AM radio wave receiver to output said signal representative of AM interference**; Yeap discloses an adder (i.e. AM radio wave receiver) that outputs the common mode interference (i.e. signal

representative of AM interference) (column 5, line 53-column 6, line 6). Therefore, Yeap discloses all limitations of the claim.

Claim 10 is essentially the same as claim 1, as covered by Yeap, with the further limitation of a **digital subscriber line front end, comprising: a DSL receiver**; Yeap discloses a DSL receiver (figure 1, element 14 and column 5, lines 43-52). Therefore, Yeap discloses all limitations of the claim.

Claims 12-14 are essentially the same as claim 3-5, respectively, and are rejected for the same reasons.

Claim 20 is essentially the same as claim 1, as covered by Yeap, and is rejected for the same reasons.

Claims 21 and 22 are rejected for the same reasons as claim 4.

Claim 23 is essentially the same as claim 4 and is rejected for the same reasons.

Claim 25 is essentially the same as claim 3 and is rejected for the same reasons.

Claims 32 and 33 are essentially the same as claims 1 and 21, respectively, and are rejected for the same reasons.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 11, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeap in view of Bingel et al. (US Patent 6,173,021).

Claim 2 is limited to **the DSL front end according to claim 1**, as covered by Yeap. Therefore, Yeap has been shown to disclose all limitations of the claim with the exception of **wherein: said summer is a digital summer**; Yeap discloses an all digital implementation of his invention, but discloses an analog adder (Yeap, column 9, line 60-column 10, line 20). Bingel teaches performing all elements of RFI cancellation digitally including using a digital adder (Bingel, figure 2, element 12) to perform the subtraction between a received signal and the output of a DSP (i.e. the DSP of Yeap), which reduces the amount of analog hardware that is bigger and less integrable than digital hardware. It would have been obvious to one of ordinary skill in the art at the time of the invention to implement the digital datapath as taught by Bingel for the purpose of reducing the amount of analog hardware which is bigger and less integrable than digital hardware.

Claim 11 is essentially the same as claim 2 and is rejected for the same reasons.

Claim 24 is essentially the same as claim 2 and is rejected for the same reasons.

Claims 7-9, 16-18, 26-29, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeap in view of Shenoi (US Patent 5,764,704).

Claim 7 is limited to **the DSL front end according to claim 1**, as covered by Yeap. Yeap discloses a bandpass filter used in processing the common mode interference signal. Therefore, Yeap discloses all limitations of the claim with the exception **wherein said AM interference canceller comprises: a Hilbert bandpass**

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filter; Shenoi teaches using a Hilbert bandpass filter for performing narrowband filtering of periodic carrier type signals (i.e. AM radio waves) (column 2, lines 18-28). It would have been obvious to one of ordinary skill in the art at the time of the invention to implement the Hilbert bandpass filter of Shenoi for the purpose of providing the narrowband bandpass filters of Yeap used for generating an interference cancellation signal.

Claim 8 is limited to **the DSL front end according to claim 7**, as covered by Yeap in view of Shenoi, **wherein said AM interference canceller further comprises: an FFT analyzer to determine a frequency of a most significant AM radio signal;** Yeap discloses using an FFT analyzer to determine the frequency of a most significant common mode interference (i.e. AM radio signal) (column 6, lines 31-36 and column 10, lines 5-8). Therefore, Yeap in view of Shenoi makes obvious all limitations of the claim.

Claim 9 is limited to **the DSL front end according to claim 7**, as covered by Yeap in view of Shenoi. Yeap discloses an adaptive algorithm used to update the filter coefficients of the bandpass filters. Therefore, Yeap in view of Shenoi makes obvious all limitations of the claim with the exception **wherein said AM interference canceller further comprises: an LMS module to adjust a frequency of I and Q channels of said Hilbert bandpass filter;** The examiner takes Official Notice of the fact that the LMS algorithm is used to perform adaptive updating of a noise cancellation system. It would have been obvious to one of ordinary skill in the art at the time of invention to implement an LMS module for the purpose of updating the Hilbert bandpass filters of Yeap in view of Shenoi.

Claims 16-18 are essentially the same as claim 7-9, respectively, and are rejected for the same reasons.

Claims 26 and 27 are essentially the same as claims 7 and 9, respectively, and are rejected for the same reasons.

Claim 28 is limited to **the method of canceling an AM interference signal from a digital subscriber line signal according to claim 27**, as covered by Yeap in view of Sheno, **further comprising: providing a coarse adjustment of said Hilbert bandpass filter with a determined carrier frequency**; Yeap discloses adjusting (i.e. coarse adjustment) the bandpass filters based on a spectral analysis (i.e. that generate a determined carrier frequency) (column 6, lines 31-36). Therefore, Yeap in view of Sheno makes obvious all limitations of the claim.

Claim 29 is limited to **the method of canceling an AM interference signal from a digital subscriber line signal according to claim 28**, as covered by Yeap in view of Sheno, **further comprising: determining said determined carrier frequency using an FFT analyzer**; Yeap discloses determining the noisiest common mode frequency (i.e. determined carrier frequency) using a FFT analyzer (column 9, line 60-column 10, line 8). Therefore, Yeap in view of Sheno makes obvious all limitations of the claim.

Claim 34 is essentially the same as claim 7 and is rejected for the same reasons.

Claims 1, 10, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bingel in view of Yeap.

Claim 1 is limited to **a DSL front end, comprising: an AM interference canceller that outputs a signal representative of AM interference**; Bingel discloses

a DSP that generates an AM interference cancellation signal (column 4, lines 13-16). Bingel discloses a differential receiver. Therefore, Bingel discloses all limitations of the claim with the exception of **a hybrid that provides a bi-directional interface with a communication channel**; Yeap teaches to use a hybrid for bi-directional interface with a twisted pair (i.e. communication channel). It would have been obvious to one of ordinary skill in the art to implement a hybrid as taught by Yeap for the purpose of providing a differential receiver as disclosed by Bingel. **Said hybrid generating an output signal representative of a signal received from said communication channel**; Bingel discloses receiving a signal from the communication line (i.e. generating an output signal representative of a signal received from channel) through the differential receiver (i.e. hybrid) (column 3, lines 28-42). **A summer that combines said output of said AM interference canceller with a signal based upon the output of the hybrid such that the AM interference in said DSL front end is substantially cancelled**; Bingel discloses an adder (figure 2, element 13) that combines a differential received signal and an interference cancellation signal (column 3, lines 49-53).

Claim 10 is essentially the same as claim 1, as covered by Bingel in view of Yeap, and is rejected for the same reasons.

Claim 20 is essentially the same as claim 1, as covered by Bingel in view of Yeap, and is rejected for the same reasons.

Claims 6, 15, 19, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bingel in view of Yeap as applied to claim 1 above, and further in view of Srinivasagopalan et al. (US Patent 4,689,804).

Claim 6 is limited to **the DSL front end according to claim 1**, as covered by Bingel in view of Yeap. Therefore, Bingel in view of Yeap discloses all limitations of the claim with the exception **wherein: said signal representative of AM interference is generated from a carrier signal recovery phase locked loop**; Srinivasagopalan teaches locking onto a sinusoidal noise source (i.e. AM carrier interference signal) using a phase locked loop so that the frequency and phase information can be used to eliminate the phase jitter from the received transmission (abstract and column 1, lines 28-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a phase locked loop as taught by Srinivasagopalan for the purpose of detecting the frequency of the common mode interference signal as and use that data for eliminating the interference as disclosed by Bingel in view of Yeap.

Claim 15 is essentially the same as claim 6 and is rejected for the same reasons.

Claim 19 is limited to **the digital subscriber line front end according to claim 10**, as covered by Bingel in view of Yeap. Therefore, Bingel in view of Yeap makes obvious all limitations of the claim with the exception **wherein said AM interference canceller comprises: a carrier recovery phase locked loop tuned to a most significant frequency of an interfering AM radio signal**; Srinivasagopalan teaches using a phase locked loop to determine a frequency of a sinusoidal noise source (i.e. interfering AM radio signal) (abstract and column 1, lines 28-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a phase locked loop as taught by Srinivasagopalan for the purpose of detecting the frequency of the common mode interference signal as and use that data for eliminating the

interference as disclosed by Bingel in view of Yeap. **A sine gain adjustment to generate a sine signal relating to said most significant frequency;**

Srinivasagopalan teaches sine wave generation (column 6, lines 63-65) and gain adjustment (column 2, lines 42-46 and 60-68). **A cosine gain adjustment to generate a cosine signal relating to said most significant frequency;** Srinivasagopalan teaches cosine wave generation (column 6, lines 63-65) and gain adjustment (column 2, lines 42-46 and 60-68) that is related to the frequency of the phase locked loop (i.e. relating to the most significant frequency). Therefore, Bingel in view of Yeap and in further view of Srinivasagopalan makes obvious all limitations of the claim.

Claim 30 is limited to **the method of canceling an AM interference signal from a digital subscriber line signal according to claim 20**, as covered by Bingel in view of Yeap. Therefore, Bingel in view of Yeap makes obvious all limitations of the claim with the exception **wherein: said AM interference replica signal is generated using an AM carrier recovery PLL**; Srinivasagopalan teaches generating an interference cancellation signal using a phase locked loop (abstract) It would have been obvious to one of ordinary skill in the art at the time of the invention to use a phase locked loop as taught by Srinivasagopalan for the purpose of detecting the frequency of the common mode interference signal as and use that data for eliminating the interference as disclosed by Bingel in view of Yeap. **Followed by gain adjustments of cosine and sine phases of said recovered AM carrier signal**; Srinivasagopalan teaches adaptively updating gain of cosine and sine waves (column 2, lines 42-46 and 60-68).

Therefore, Bingel in view of Yeap and in further view of Srinivasagopalan makes obvious all limitations of the claim.

Claim 31 is limited to **the method of canceling an AM interference signal from a digital subscriber line signal according to claim 30**, as covered by Bingel in view of Yeap and in further view of Srinivasagopalan, **further comprising: adjusting said gain adjustments based on an LMS algorithm** The examiner takes Official Notice of the fact that the LMS algorithm is used to perform adaptive updating of a noise cancellation system. It would have been obvious to one of ordinary skill in the art at the time of invention to implement an LMS module for the purpose of adaptively updating the gain of the cosine and sine waves of Bingel in view of Yeap and in further view of Srinivasagopalan.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter F Briney III whose telephone number is 703-305-0347. The examiner can normally be reached on M-F 8am - 4:30pm.

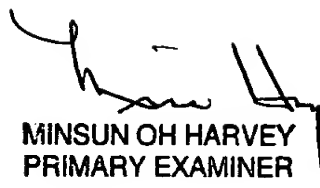
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W Isen can be reached on 703-305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

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PRIMARY EXAMINER